CLAIMS

1. An image processing method characterized by comprising:

a decoding step, in which an encoded stream, obtained by encoding an original video signal with a first resolution, is decoded and in which an encoding parameter is extracted from the encoded stream; and

a resolution converting step, in which a characteristic of the original video signal is identified by the encoding parameter and in which the original video signal decoded is converted into a new video signal with a second resolution by a resolution conversion method associated with the characteristic.

2. The image processing method of Claim 1, characterized in that in the resolution converting step, a motion characteristic of a picture represented by the original video signal is identified as the characteristic of the original video signal.

3. The image processing method of Claim 2, characterized in that the encoding parameter comprises at least one of: a motion vector representing a quantity of motion of a video unit; a type of orthogonal transformation to be performed us-

ing either a frame structure or a field structure; and a mode of motion compensation to be performed using either the frame structure or the field structure.

4. The image processing method of Claim 1, characterized in that in the resolution converting step,

a picture represented by the original video signal decoded is divided into a still area and a moving area by using the encoding parameter, and

the original video signal is converted into the new video signal with mutually different resolution conversion methods applied to the still and moving areas.

5. The image processing method of Claim 4, characterized in that the original video signal is an interlaced signal, and

that the resolution conversion is performed on the still area on a frame basis, while the resolution conversion is performed on the moving area on a field basis.

6. The image processing method of Claim 4, characterized in that the encoding parameter is a motion vector representing a quantity of motion of a video unit, and

that the area division is carried out based on a result of comparison between the absolute value of the motion vector

and a predetermined value.

7. The image processing method of Claim 1, characterized in that the encoded stream of the original video signal has been encoded in compliance with an MPEG (Moving Picture Experts Group) standard.

8. The image processing method of Claim 1, characterized in that the first resolution is higher than the second resolution.

9. An image processing apparatus characterized by comprising:

a video decoder for decoding an encoded stream, obtained by encoding an original video signal with a first resolution, and for extracting an encoding parameter from the encoded stream; and

a resolution converter, which receives the original video signal and the encoding parameter that have been output from the video decoder, identifies a characteristic of the original video signal by the encoding parameter and converts the original video signal into a new video signal with a second resolution by a resolution conversion method associated with the characteristic.

10. The image processing apparatus of Claim 9, characterized in that the resolution converter identifies a motion characteristic of a picture represented by the original video signal as the characteristic of the original video signal.

11. The image processing apparatus of Claim 10, characterized in that the encoding parameter comprises at least one of: a motion vector representing a quantity of motion of a video unit; a type of orthogonal transformation to be performed using either a frame structure or a field structure; and a mode of motion compensation to be performed using either the frame structure or the field structure.

12. The image processing apparatus of Claim 9, characterized in that the resolution converter comprises:

an area dividing section for dividing a picture represented by the input original video signal into a still area and a moving area by using the encoding parameter;

a still-area resolution converting section for converting a video signal representing the still area, which has been output from the area dividing section, into the video signal with the second resolution; and

a moving-area resolution converting section for converting a video signal representing the moving area, which has been output from the area dividing section, into the video

signal with the second resolution.

13. The image processing apparatus of Claim 12, characterized in that the original video signal is an interlaced signal, and

that the still-area resolution converting section performs the resolution conversion on a frame basis, and

that the moving-area resolution converting section performs the resolution conversion on a field basis.

14. The image processing apparatus of Claim 12, characterized in that the encoding parameter is a motion vector representing a quantity of motion of a video unit, and

that the area dividing section performs the area division based on a result of comparison between the absolute value of the motion vector and a predetermined value.

15. The image processing apparatus of Claim 9, characterized in that the encoded stream of the original video signal has been encoded in compliance with an MPEG standard.

16. The image processing apparatus of Claim 9, characterized in that the first resolution is higher than the second resolution.

17. An image processing method characterized by comprising:

a decoding step, in which an encoded stream, obtained by encoding an original video signal with a first resolution, is decoded and in which a motion vector is extracted from the encoded stream; and

a resolution converting step, in which the original video signal decoded is converted into a new video signal with a second resolution by using the motion vector extracted.

18. The image processing method of Claim 17, characterized in that the resolution converting step comprises

an area dividing step in which a picture represented by the original video signal decoded is divided into a quasi-still area and a moving area by using the motion vector extracted, and

that the resolution is converted into that of the new video signal by using the extracted motion vector for the quasi-still area and without using the extracted motion vector for the moving area.

19. The image processing method of Claim 18, characterized in that in the area dividing step,

pixel-by-pixel motion vectors with directions similar to that of the extracted motion vector are estimated from the

extracted motion vector, and

an area, in which the pixel-by-pixel motion vectors have been estimated, is regarded as the quasi-still area, while an area, in which none of the vectors has been estimated, is regarded as the moving area.

20. The image processing method of Claim 19, characterized in that in the quasi-still area, the resolution is converted into that of the new video signal by using the pixel-by-pixel motion vectors estimated.

21. The image processing method of Claim 18, characterized in that in the area dividing step,

an area, in which the absolute value of the extracted motion vector is less than a predetermined threshold value, is regarded as the quasi-still area, while an area, in which the absolute value is greater than the threshold value, is regarded as the moving area.

22. The image processing method of Claim 17, characterized in that the encoded stream of the original video signal has been encoded in compliance with an MPEG standard.

23. The image processing method of Claim 17, characterized in that the first resolution is lower than the second

resolution.

24. An image processing apparatus characterized by comprising:

a video decoder for decoding an encoded stream, obtained by encoding an original video signal with a first resolution, and for extracting a motion vector from the encoded stream; and

a resolution converter, which receives the original video signal and the motion vector that have been output from the video decoder and converts the original video signal into a new video signal with a second resolution by using the motion vector.

25. The image processing apparatus of Claim 24, characterized in that the resolution converter comprises:

an area dividing section, which receives the original video signal and the motion vector and divides a picture represented by the original video signal into a quasi-still area and a moving area by using the motion vector;

a quasi-still-area resolution converting section for converting a video signal representing the quasi-still area, which has been output from the area dividing section, into the video signal with the second resolution by using the motion vector; and

a moving-area resolution converting section for converting a video signal representing the moving area, which has been output from the area dividing section, into the video signal with the second resolution without using the motion vector.

26. The image processing apparatus of Claim 25, characterized in that the area dividing section comprises

a motion vector estimating section for estimating, from the motion vector, pixel-by-pixel motion vectors with directions similar to that of the motion vector, and

that an area, in which the pixel-by-pixel motion vectors have been estimated by the motion vector estimating section, is regarded as the quasi-still area, while an area, in which none of the vectors has been estimated, is regarded as the moving area.

27. The image processing apparatus of Claim 26, characterized in that the quasi-still-area resolution converting section converts the resolution by using the pixel-by-pixel motion vectors estimated by the motion vector estimating section.

28. The image processing apparatus of Claim 25, characterized in that the area dividing section regards an area, in

which the absolute value of the motion vector is less than a predetermined threshold value, as the quasi-still area, and also regards an area, in which the absolute value is greater than the threshold value, as the moving area.

29. The image processing apparatus of Claim 24, characterized in that the encoded stream of the original video signal has been encoded in compliance with an MPEG standard.

30. The image processing apparatus of Claim 24, characterized in that the first resolution is lower than the second resolution.

31. An image processing method characterized by comprising the steps of:

decoding a first encoded stream, obtained by encoding an original video signal with a first resolution, and extracting a first encoding parameter from the first encoded stream;

converting the original video signal decoded into a new video signal with a second resolution;

changing the first encoding parameter into a second encoding parameter for use in encoding the new video signal; and

encoding the new video signal using the second encoding parameter, thereby generating a second encoded stream.

32. The image processing method of Claim 31, characterized in that in the step of changing the encoding parameters, the first encoding parameter, which has been used to encode a first area of a picture represented by the original video signal, is changed into the second encoding parameter, which will be used to encode a second area of a picture represented by the new video signal, the second area including part of the picture represented in the first area.

33. The image processing method of Claim 32, characterized in that the first and second encoding parameters are motion vectors.

34. The image processing method of Claim 33, characterized in that in the step of changing the encoding parameters, a value, which has been obtained by performing a predetermined arithmetic operation on the motion vector of the first area, is regarded as the motion vector of the second area.

35. The image processing method of Claim 33, characterized in that in the step of changing the encoding parameters, a weighted average of the motion vectors of the first area is regarded as the motion vector of the second area.

36. The image processing method of Claim 32, character-

ized in that the first and second encoding parameters each represent a type of orthogonal transformation to be performed using either a frame structure or a field structure.

37. The image processing method of Claim 31, characterized in that the first encoded stream has been encoded in compliance with an MPEG standard.

38. The image processing method of Claim 31, characterized in that the second encoded stream is encoded in compliance with an MPEG standard.

39. An image processing apparatus characterized by comprising:

a video decoder for decoding a first encoded stream, obtained by encoding an original video signal with a first resolution, and for outputting a first encoding parameter from the first encoded stream;

a resolution converter for converting the original video signal, which has been output from the video decoder, into a new video signal with a second resolution;

an encoding parameter changer for changing the first encoding parameter, which has been output from the video decoder, into a second encoding parameter for use in encoding the new video signal; and

a video encoder for encoding the new video signal output from the resolution converter by using the second encoding parameter output from the encoding parameter changer, thereby generating a second encoded stream.

40. The image processing apparatus of Claim 39, characterized in that the encoding parameter changer changes the first encoding parameter, which has been used to encode a first area of a picture represented by the original video signal, into the second encoding parameter, which will be used to encode a second area of a picture represented by the new video signal, the second area including part of the picture represented in the first area.

41. The image processing apparatus of Claim 40, characterized in that the first and second encoding parameters are motion vectors.

42. The image processing apparatus of Claim 41, characterized in that the encoding parameter changer regards a value, which has been obtained by performing a predetermined arithmetic operation on the motion vector of the first area, as the motion vector of the second area.

43. The image processing apparatus of Claim 41, charac-

terized in that the encoding parameter changer regards a weighted average of the motion vectors of the first area as the motion vector of the second area.

44. The image processing apparatus of Claim 40, characterized in that the first and second encoding parameters each represent a type of orthogonal transformation to be performed using either a frame structure or a field structure.

45. The image processing apparatus of Claim 39, characterized in that the first encoded stream has been encoded in compliance with an MPEG standard.

46. The image processing apparatus of Claim 39, characterized in that the second encoded stream is encoded in compliance with an MPEG standard.

47. An image processing method characterized by comprising the steps of:

decoding a first encoded stream, obtained by encoding an original video signal with a first resolution, and extracting a first motion vector from the first encoded stream;

converting the original video signal decoded into a new video signal with a second resolution;

defining setting information based on the first motion

vector to estimate a second motion vector for use in encoding the new video signal;

estimating the second motion vector in accordance with the setting information defined; and

encoding the new video signal using the second motion vector estimated, thereby generating a second encoded stream.

48. The image processing method of Claim 47, characterized in that an initial value of the second motion vector is determined as the setting information.

49. The image processing method of Claim 47, characterized in that a search range in which the second motion vector is estimated is determined as the setting information.

50. The image processing method of Claim 47, characterized in that the first encoded stream has been encoded in compliance with an MPEG standard.

51. The image processing method of Claim 47, characterized in that the second encoded stream is encoded in compliance with an MPEG standard.

52. An image processing apparatus characterized by comprising:

a video decoder for decoding a first encoded stream, obtained by encoding an original video signal with a first resolution, and for extracting a first motion vector from the first encoded stream;

a resolution converter for converting the original video signal, which has been output from the video decoder, into a new video signal with a second resolution;

a motion compensation setter for generating setting information based on the first motion vector, which has been output from the video decoder, to estimate a second motion vector for use in encoding the new video signal; and

a video encoder for estimating the second motion vector in accordance with the setting information generated by the motion compensation setter and encoding the new video signal, which has been output from the resolution converter, using the second motion vector estimated, thereby generating a second encoded stream.

53. The image processing apparatus of Claim 52, characterized in that the motion compensation setter determines an initial value of the second motion vector as the setting information.

54. The image processing apparatus of Claim 52, characterized in that the motion compensation setter determines a

search range, in which the second motion vector is estimated, as the setting information.

55. The image processing apparatus of Claim 52, characterized in that the first encoded stream has been encoded in compliance with an MPEG standard.

56. The image processing apparatus of Claim 52, characterized in that the second encoded stream is encoded in compliance with an MPEG standard.

57. An image processing method characterized by:

converting an original video signal having a first resolution into a new video signal having a second resolution and a black-level area in part of its picture;

encoding the new video signal except the black-level area thereof, thereby generating a first encoded stream; and

combining a second encoded stream, obtained by encoding the black-level area of the video signal, with the first encoded stream, thereby generating an encoded stream for the new video signal.

58. An image processing method characterized by:

converting an original video signal having a first resolution into part of a new video signal, the new video signal

having a second resolution and a black-level area in the other part of its picture;

encoding the video signal, thereby generating a first encoded stream; and

combining a second encoded stream, obtained by encoding the black-level area of the video signal, with the first encoded stream, thereby generating an encoded stream for the new video signal.

59. The image processing method of Claim 57 or 58, characterized in that the encoding is performed in compliance with an MPEG standard.

60. An image processing apparatus characterized by comprising:

a resolution converter for converting an original video signal having a first resolution into a new video signal having a second resolution and a black-level area in part of its picture; and

a video encoder for encoding the new video signal except the black-level area thereof to generate a first encoded stream and combining a second encoded stream, obtained by encoding the black-level area of the video signal, with the first encoded stream, thereby generating an encoded stream for the new video signal.

61. An image processing apparatus characterized by comprising:

a resolution converter for converting an original video signal having a first resolution into part of a new video signal, the new video signal having a second resolution and a black-level area in the other part of its picture; and

a video encoder for encoding the video signal to generate a first encoded stream and combining a second encoded stream, obtained by encoding the black-level area of the video signal, with the first encoded stream, thereby generating an encoded stream for the new video signal.

62. The image processing apparatus of Claim 60 or 61, characterized in that the video encoder performs the encoding in compliance with an MPEG-2 standard.